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Spatial Harmonic Techniques for *in vivo* Imaging

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As a further development of grating-based full-field phase-contrast imaging techniques, I will describe the spatial harmonic technique that is suitable for applications that demand speed, such as *in vivo* imaging of live animals. This method can obtain differential phase-contrast, diffraction, and absorption images all in a single shot, by capturing a grating-modulated image in high resolution and analyzing it in the Fourier domain. I will show 2D grating and double grating implementations and the first live animal experiment, and discuss future development of the technique.